

FLOW REACTORS FOR CHEMICAL CONVERSIONS WITH
HETERGENEOUOS CATALYSTS
ABSTRACT OF THE INVENTION

Improved apparatus for use in process systems which include exothermic
5 chemical conversions of organic compounds to value added products is disclosed,
more particularly, flow reactors for exothermic chemical conversions using a fixed
heterogeneous catalyst with means for control of the exotherm. Flow reactors of the
invention comprise a plurality of walled conduits each having an outer surface
disposed for contact with a heat-transfer medium, an inlet distribution manifold
10 adapted for flow communication with a downstream manifold through channels
formed by heterogeneous catalytic material disposed within each conduit during
operation in a sequence of zones for catalyst having the same or different length
along the longitudinal coordinate of the conduit and within each zone essentially
uniform cross-section of the conduit measured in a plane perpendicular to the
15 longitudinal coordinate thereby defining volume of the zone, and the sequence of
zones comprising of at least two zones such that each downstream zone has a larger
or smaller cross-section than the contiguous upstream zone. Another aspect of the
invention includes processes which use such flow reactors, for example the
continuous manufacture of maleic anhydride.